

REMARKS

Claims 29-30 and 33-47 are pending in this application. Applicants respectfully submit that all pending claims are allowable for at least the reasons set forth below.

The Office Action (i) rejects claims 29, 33-42 and 46 under 35 U.S.C. §103(a) over Japanese Patent Publication No. 60-49987 to Niwa et al. (Niwa) in view of Japanese Patent Publication No. 8-238587 to Soga; (ii) rejects claims 30, 44 and 47 under 35 U.S.C. §103(a) over Niwa in view of Soga, and further in view of Japanese Patent Publication No. 2000-263276 to Aoyama; and (iii) rejects claims 43 and 45 under 35 U.S.C. §103(a) over Niwa in view of Soga and Aoyama, and further in view of Japanese Patent Publication No. 59-223191 to Suzuki et al. (Suzuki). Applicants respectfully traverse the rejections.

Niwa discloses a vertical laser nozzle 18, an ejection nozzle 26 disposed alongside the laser nozzle 18, the nozzle 26 ejecting assist gas 28, and a nozzle 30 to remove the assist gases 22 (from the laser nozzle 18) and 28. Fig. 2 of Niwa shows a front view of Niwa's system in operation. That is, the weld direction is perpendicular to the plane of Fig. 2, coming out of the page. Thus, the assist gas 28 is ejected across the laser beam perpendicular to the welding direction.

Thus, Niwa fails to disclose either 1) a plasma suppression means located behind the laser head in the welding direction or 2) gas extraction means in front of the laser head in the welding direction (e.g., diametrically opposite to the plasma suppression means).

Soga teaches that the plasma generated at the time of laser welding may be removed by spraying Argon gas (called side gas) into the weld zone from a side nozzle 2. As Soga's name for it states, side nozzle 2 is located to the side of head 1 relative to the weld direction. The side nozzle 2 is articulated and movable so that the angle, height etc., of the side nozzle may be changed. Soga fails to disclose use of a suction or extraction nozzle that the nozzle 2 may be moved to spray gas onto the weld zone from behind the weld head relative to the

direction of welding movement. In the variations discussed in Soga, the gas nozzle 2 is always referred to as a "side nozzle".

Thus, Soga fails to cure the deficiencies of Niwa. Similarly, Aoyama and Suzuki fail to cure the deficiencies of Niwa.

Applicants respectfully submit that the Office Action's allegations (§6) that the features that the plasma suppression means "is positioned behind the laser head, relative to the welding direction" and that the extraction means is located "in front of the laser head, relative to the welding direction" are "statements regarding the manner of use" are incorrect.

Independent claim 29 is directed to a laser welding apparatus. As recited in claim 29, "the laser welding apparatus is adapted to move the laser beam relative to the workpiece in a welding direction." Because the laser welding apparatus is an apparatus and is able to control the direction of the welding movement, the features that relate to the claimed position of the plasma suppression means behind the laser head relative to the welding direction and the extraction means is located in front of the laser head relative to the welding direction are structural and must be given full patentable weight.

Regarding independent claim 47, the Office Action's argument (§6) that the welding directions of the apparatus of Niwa and Soga cannot be determined while in shipment is immaterial to claim 47. Claim 47 is a method claim. As discussed above, the apparatus of both Niwa and Soga eject gases from the side of the welding direction. Because both Niwa and Soga disclose ejection of gas from the side of the welding direction in operation, they cannot anticipate the feature of "using plasma suppression means to direct plasma suppression gas from behind the laser beam, relative to the welding direction" as recited in claim 47.

For the foregoing reasons, Applicants respectfully request withdrawal of the rejections.

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of the claims are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,



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